PSG
Plastic Service Group

Service Manual

Sequential Valve Gate Controller

VCON

CE

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1 Typographical Conventions

Symbols and conventions are used in this document for faster orientation for you.

Symbols

	Caution	With this symbol, references and information are displayed which are decisive for the operation of the device. In case of non-compliance with or inaccurate compliance there can result damage to the device or injuries to persons.
	Note	The symbol refers to additional information and declarations, which serve for improved understanding.
	Example	With the symbol, a function is explained by means of an example.
	Reference	With this symbol, information in another document is referred to.
	FAQ	Here FAQ (Frequently Asked Questions) are answered.
↗		Cross references are marked with the character f. In the pdf version of the document the objective of the cross reference is reached via the link.
`Equations`		Calculation specifications and examples are represented in this way.
<View>		Menu points (e.g. view) are represented in this way.
|Project|		Windows (e.g. project) are represented in this way.
n.a.		Not applicable, not existing

1.1 Additional and continuative documents

	Operation	Operating instructions VCON Sequential Valve Gate Controller
	Data sheets and operating manuals	Available by Internet see www.psg-online.de

2 Security References

Before installation, handling or operation of the device, please read through this manuals completely and carefully.

2.1 Security References for User

All persons, responsible for the mounting/start-up/operation/maintenance/servicing of the device, have to

- be skilled appropriately
- consider the manuals exactly
- regard this manuals as part of the product
- maintain the manuals during lifetime of the product
- pass the manuals to all successive owners or operators of the product
- make sure, that every obtained amendment is integrated in the instructions

Please note the following safety instructions necessarily for protection against electric shock, risks of injuries and fire.

Before start-up, adhere strictly to the local safety regulations as well as the safety instruction.

Consider the regulations for prevention of industrial accidents for electrical installations and equipment by government safety organization in industrial facilities.

Do not throw packaging material careless away, thermoplastic foil/ styrofoam parts etc. may get dangerous for children.

Position the device exclusively on planes of stable and solid ground.

Protect device against moisture. Do not use in areas with high humidity.

Check, that the specified voltage on the type plate is identical with the mains voltage on-site.

Before each use check device, power supply cord and connector.

Ensure that the power cord and the connecting cables are not damaged by overrun, squeezing, tearing or suchlike. Protect the cords/cables against oil, sharp edges and temperatures above 70 °C.

Do not touch the mains plug with wet hands.

Lock the connected counter plug on the rear side of the device with retaining brackets against accidental removal.

Connect the connecting cable only in switched-off status.
Place the connecting cable to prevent stumbling.

Assure yourself that the connected mold is linked to the protective conductor.

Do not place any tanks, filled with liquid, on the top of the device, otherwise a dangerous situation may emerge.

Keep the ventilation slots open. Do not insert any objects.
Maintenance and repair work may be carried out by authorized persons only. Only skilled and on the risks trained persons may use the device. The relevant accidental regulations as well as other general approved safety-rele-

vant, occupational-medical norms have to be obeyed. Unauthorized modifications of the device exclude liability of the manufacturer for resultant damages.

Before opening of the device always switch-off the mains switch and unplug the mains plug or make sure that the device is de-energized. Protect against unintentional reclosing.

Parts of components or components may only be brought into operation, when they were implemented safe of contact before. During installation they have to be de-energized.

For person and property damages, resulting of not considering these manuals or not considering these safety instruction, warranty claim terminates. For consequential damage we assume no liability.

2.1.1 Intended use

The Sequential Valve Gate Controller VCON is a cascade control system for graded controlling of valve gate nozzle in hot runner molds for injection molding machines.

More specific descriptions are given in the operating instructions.

When properly used, the safety of the user and the device is guaranteed.

The device may only be used for this purpose. If used for other purposes, the manufacturer / supplier will not take any responsibility and warranty for damages and consequential damages.

2.1.2 Maintenance

No special maintenance of the cascade control system VCON is necessary. Maintain a clean surface of the operating unit. For cleaning use a damp cloth. Avoid the use of solvents, cleansers and abrasives.

2.2 Warranty Conditions

This product is subject to the legal warranty time periods for faults or deficiencies in manufacture.

Content of Warranty

If a malfunction relatively occurs through the manufacture, the supplier repairs or replaces the nonconforming product, according to their own discretion.

The following repairs do not fall under the warranty and are liable to costs:

- Malfunctions after the legal notice periods have expired.
- Malfunctions caused through operating error of the user (if the device is not operated as described in the manual).
- Malfunctions caused through other devices.
- Changes or damage to the device which do not originate from the manufacturer.

If you wish to use services within the framework of this warranty, please refer to the supplier.

2.3 Transport and Storage

2.3.1 Transport

The cascade control system VCON is packed fully-mounted in a robust carton, cushioned with foamed material. This assures sufficient protection in normal case.

To avoid damage, the cascade control systems VCON must be transported STANDING.

2.3.2 Storage

If you should not put the cascade control system VCON into operation immediately, store it protected against dirt and moisture. Permissible temperature -20…70°C, average permissible humidity < 75 % per year, no condensation.

3 Installation

3.1 Installation References

Unpacking

The device is packed fully-mounted in a robust carton.
Check the packaging and then the device for identifiable damage incurred during transit. If damage is identified, then please get in touch with the transportation company.

	In the case of damage the device may not be brought into operation.

	Before beginning and during all installation/dismantling work, attention is to be paid that the system, as well as the devices, are de-energized

	Only components of similar type may be exchanged. In case of replacement, it is absolutely necessary to adopt the setting adjustments of the replaced component.

3.2 Electrical Connection

	The cascade control system VCON may be installed and put into operation by specialist personnel only. Before the start signal cycle it is to ensure that the cascade control system VCON is configured for the application. An incorrect configuration can lead to damage to the valve gate nozzle or to injuries to persons.

3.2.1 Power supply

The cascade control systems VCON can be activated/deactivated by using the power supply switch.

Consider connected load.
Check the power supply under the terms of the wiring diagram

Electrical data	230 VAC; 1P/N/PE; 50...60 Hz

3.2.2 Control fuse

To protect the power supply of the device.

Electrical data	6.3 A MT (medium time lag)

3.2.3 Power outputs (Plug XA)

Power outputs to control the valves.

Consider the device specific terminal assignment (see specifications).

	XA*		**Plug** **Power outputs**	Example for Standard series	
	16 pole, socket insert				
	Pin	**Pin**	**Function and/or signal**		
	1 +	9 -	Valve 1	VCON 04 & VCON 04 plus	VCON 08 & VCON 08 plus
	2 +	10 -	Valve 2		
	3 +	11 -	Valve 3		
	4 +	12 -	Valve 4		
	5 +	13 -	Valve 5		
	6 +	14 -	Valve 6		
	7 +	15 -	Valve 7		
	8 +	16 -	Valve 8		
Further plugs	...		...		

Electrical data	Max. 1.5 A; 24 VDC; melt fuse per output 2 A FF (very fast acting)

Technical changes reserved

3.2.4 [VCON plus OPTION] Digital inputs (signal plug XM1*)

Digital inputs to signal the pin position (limit switch).

Consider the device specific terminal assignment (see specifications).

<table>
<tr><td rowspan="3"> </td><td colspan="2">XM1*</td><td>Signal plug
Signalizing of control of pin position</td><td colspan="2" rowspan="2">Example for Standard series</td></tr>
<tr><td colspan="3">24 pole, socket insert</td></tr>
<tr><td>Pin</td><td></td><td>Function and/or signal</td><td></td><td></td></tr>
<tr><td>1</td><td></td><td>Nozzle 1 close</td><td rowspan="8">VCON 04 & VCON 04 plus</td><td rowspan="24">VCON 08 & VCON 08 plus</td></tr>
<tr><td>2</td><td></td><td>Nozzle 1 open</td></tr>
<tr><td>3</td><td></td><td>Nozzle 2 close</td></tr>
<tr><td>4</td><td></td><td>Nozzle 2 open</td></tr>
<tr><td>5</td><td></td><td>Nozzle 3 close</td></tr>
<tr><td>6</td><td></td><td>Nozzle 3 open</td></tr>
<tr><td>7</td><td></td><td>Nozzle 4 close</td></tr>
<tr><td>8</td><td></td><td>Nozzle 4 open</td></tr>
<tr><td>9</td><td></td><td>Nozzle 5 close</td><td></td></tr>
<tr><td>10</td><td></td><td>Nozzle 5 open</td><td></td></tr>
<tr><td>11</td><td></td><td>Nozzle 6 close</td><td></td></tr>
<tr><td>12</td><td></td><td>Nozzle 6 open</td><td></td></tr>
<tr><td>13</td><td></td><td>Nozzle 7 close</td><td></td></tr>
<tr><td>14</td><td></td><td>Nozzle 7 open</td><td></td></tr>
<tr><td>15</td><td></td><td>Nozzle 8 close</td><td></td></tr>
<tr><td>16</td><td></td><td>Nozzle 8 open</td><td></td></tr>
<tr><td>17
18
19
20</td><td></td><td>24 VDC+ (internally bridged)</td><td rowspan="8">VCON 04 & VCON 04 plus</td><td rowspan="8">VCON 08 & VCON 08 plus</td></tr>
<tr><td>21
22
23
24</td><td></td><td>24 VDC- (internally bridged)</td></tr>
<tr><td>Further plugs</td><td>...</td><td></td><td>...</td><td></td><td></td></tr>
</table>

Electrical data	15-30 VDC

3.2.5 Digital output (Signal plug XM2 DO)

The output of collective alarm for alarm messages of type

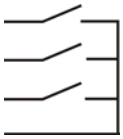
- potential-free relay contact (output 1 relay)
- 5 pole output plug type Wieland (4 pole & PE)

	XM2 **DO**		**Signal plug** **Collective alarm**
	5 pole, pin insert		
	Pin		**Function and/or signal**
	1		
	2		
	3		n.a.
	4		n.a.
	5		⏚

Electrical data	230 VAC; 8 A
Standard setting	☑ Alarm high-active

3.2.6 Digital inputs (Signal plug XM3 DI)

Digital inputs for the transmission of the machine signals.

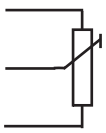
	XM3 **DI**		**Signal plug**	
	5 pole, socket insert			
	Pin		**Function and/or signal**	
	1		Machine enable signal	
	2		Cycle start signal	
	3		End holding pressure signal	
	4		24 VDC+ OUT	
	5		⏚	

Electrical data	15-30 VDC
Standard setting	☐ Machine enable signal available ☑ Machine enable signal high-Active ☑ Cycle start signal high-active ☑ End holding pressure signal available ☑ End holding pressure signal high-active

3.2.7 Analog input (Signal plug XM4 AI)

Analog input to signalize the displacement transducer, only when displacement transducer is available.

	XM4 **AI**	**Signal plug** **Signaling of displacement transducer**
	6 pole, pin insert	
	Pin	**Function and/or signal**
	2	0 V
	1	0-10V
	3	24VDC+
	4	0VDC-
	5	n.a.
	6	n.a.



Electrical data	0-10 VDC

Is no displacement transducer available, the cascade control system VCON works only time-dependent.

4 Setup VCON

Before installation, handling or operation of the device, please read through this manuals completely and carefully.

4.1 Scope of supply

Standard equipment includes the cascade control system VCON

PSG Product catalog control systems	CD-ROM

Alle technischen Informationen
zur Regeltechnik griffbereit
All technical informations on Control Systems
within close reach
Produktkatalog / Technische Informationen / Software
Product Catalog / Technical informations / Software

Data sheet	See CD-ROM
Operating instructions German/English	Printout
Service manual	See CD-ROM
Specifications - Pin assignment	Printout
Wiring diagrams	Printout

4.2 Type plate

The type plate is fixed on the rear side of the device. Using the information on the type plate, the delivery status of the cascade control system VCON can be understood exactly.

The following information can be taken from the type plate:

Typ / Type:	**VCON 04 plus**
Artikelnr./article no.:	**179204-050**
Seriennr./serial no.:	**1737**
Spannung/voltage	**230V~1P+N+PE 50/60HZ**
Anschluss/power:	**max.: 3,5 KW**
Baujahr / manufacturing date:	**KW / week 20/2012**

PSG Plastic Service GmbH
Pirnaer Str. 12-16 D-68309 Mannheim
Tel. +49 621 7162 0 / www.psg-online.de
MADE IN GERMANY

Example VCON 04 plus

5 Installation and Start-up

Before installation, handling or operation of the device, please read through this manuals completely and carefully.

5.1 Setting up

The cascade control system VCON should be set up horizontally and dry.

5.2 Connect

The electrical and hydraulic connections to the cascade control system VCON are to be prepared by authorized personnel and must be checked for correct execution.

Consider connected load (see wiring diagram).

The electrical, hydraulic and mechanical connections are to be carried out by authorized personnel. For damage caused by incorrect connection and improper handling of the device, there is no warranty claim.

6 Initial operation

6.1 Imperative required signals

6.1.1 Digital inputs XM3 DI - Start signal cycle

The cascade control system VCON only works, when the start signal cycle is active on input XM3 DI Pin 2 (see ↗Digital inputs (Signal plug XM3 DI)).

As start signal cycle for the injection molding machine the following signals can be used:

- Signal start injection
- Clamping force start

6.1.2 Power outputs XA*

The control for the nozzles must be connected professionally and the nozzle allocation must be checked.

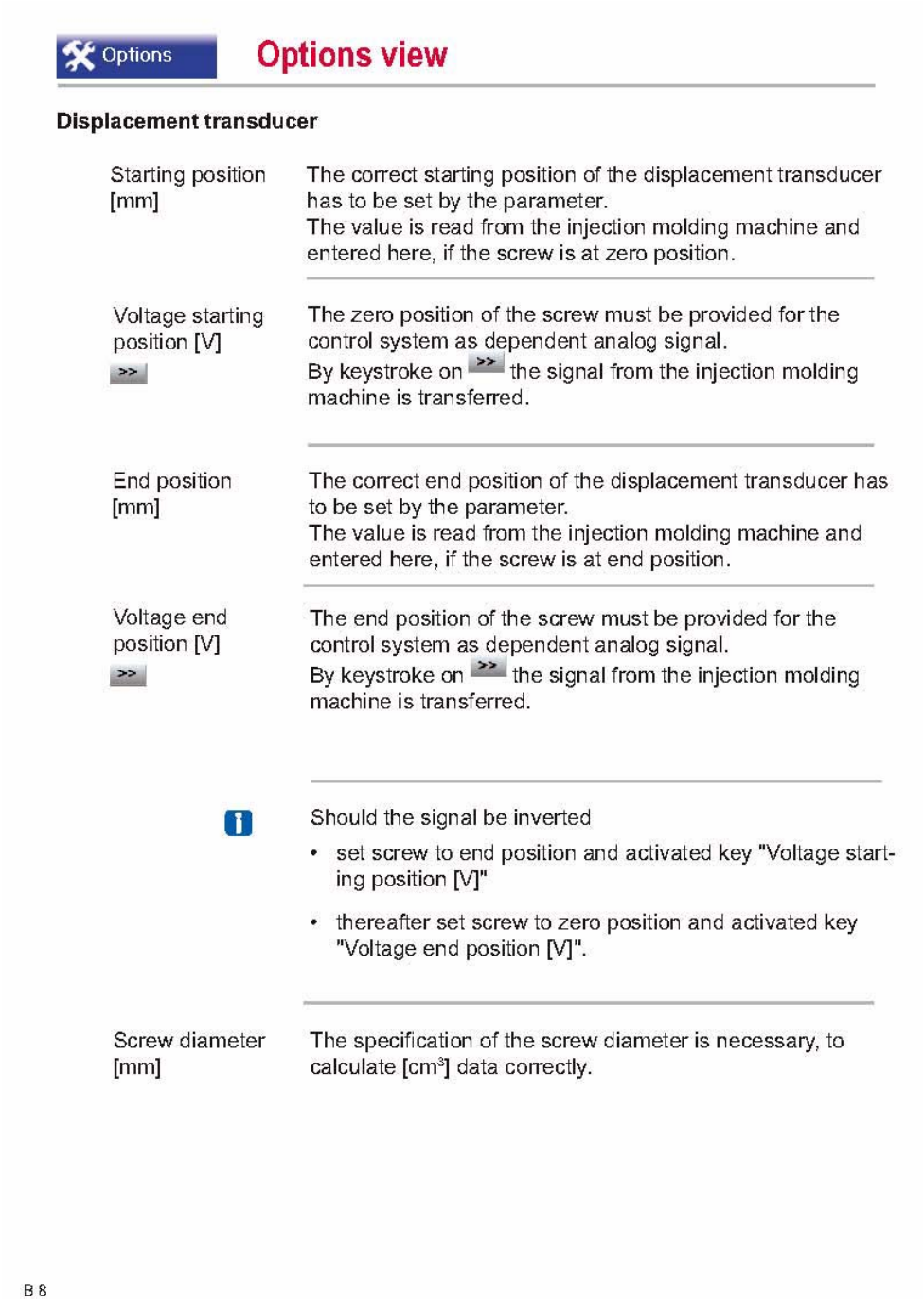
To check the allocation for the nozzles, you may change into MANUAL MODE (details see operating instructions).

6.2 Path-dependent control of nozzle

6.2.1 Analog input XM4 AI - Displacement transducer

In case of a path-dependent control of a nozzle, a displacement transducer must be available. In addition, the following parameters have to be pre-configured

☑ Displacement transducer available


Options
Options view
Displacement transducer
Starting position [mm]
The correct starting position of the displacement transducer has to be set by the parameter.
The value is read from the injection molding machine and entered here, if the screw is at zero position.
Voltage starting position [V]
>>
The zero position of the screw must be provided for the control system as dependent analog signal.
By keystroke on >> the signal from the injection molding machine is transferred.
End position [mm]
The correct end position of the displacement transducer has to be set by the parameter.
The value is read from the injection molding machine and entered here, if the screw is at end position.
Voltage end position [V]
>>
The end position of the screw must be provided for the control system as dependent analog signal.
By keystroke on >> the signal from the injection molding machine is transferred.
Should the signal be inverted
• set screw to end position and activated key "Voltage starting position [V]"
• thereafter set screw to zero position and activated key "Voltage end position [V]".
Screw diameter [mm]
The specification of the screw diameter is necessary, to calculate [cm³] data correctly.

B 8

Works the cascade control system VCON only time-dependent, the connection for the „signal of displacement transducer“ (XM4 AI) is unnecessary.

6.3 Additional configurable signals

6.3.1 Machine enable signal

Is the machine enable signal at the cascade control system VCON (see operating instructions setting OPTIONS view) configured, VCON will only work if the machines enable signal at the input XM3 DI pin 1 is activated permanently (see ↗Digital inputs (Signal plug XM3 DI)), before a start signal cycle.

6.3.2 End holding pressure signal

Is there an end holding pressure signal at the cascade control system VCON (setting see operating instructions OPTIONS view) configured, this signal can be used to turn off all open nozzles, depending on the delay time (see OPTIONS view) before the switch-off is reached.

6.3.3 Tolerance backward movement

Is there a value for the parameter tolerance backward movement at the cascade control system VCON (setting see operating instructions OPTIONS view) configured and exceeded, all still open nozzles are closed dependent on the delay time and the control system is prepared for the next injection cycle.

6.3.4 Digital output XM2 DO - System alarm

There are 4 system alarms. The system alarms are output as collective alarm on XM2 DO Pin 1&2 as potential-free contact.

6.3.5 [OPTION] Digital inputs XM1* - Signalizing of the pin position (limit switch)

In case that the cascade control system VCON has an optional control of pin position, the digital inputs XM1* can be used for signalizing the pin position (limit switch). The allocation of belonging of sensors to single nozzles has to be checked (see specifications).

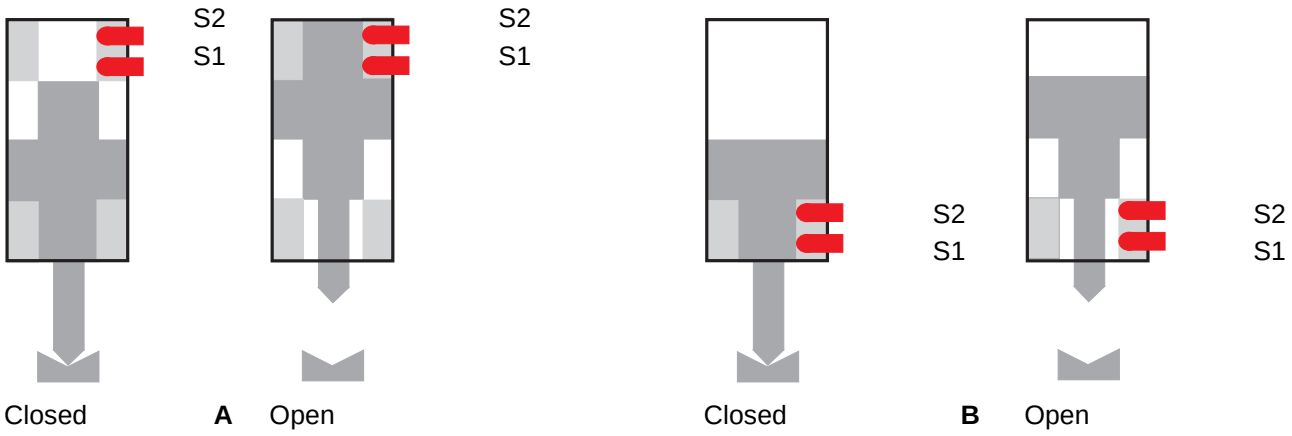
6.3.6 Pin closed - Sensor definition

The pin is identified as closed, when

0 - Sensor 1 high / Sensor 2 low (A) (Opener / Closer)

1 - Sensor 1 low / Sensor 2 low (A) (Closer / Closer)

2 - Sensor 1 high / Sensor 2 high (B) (Closer / Closer)



Pin closed=high/high

S1 = Closer & S2 = Closer

S1	S2	See **B**
0	0	Pin open
0	1	"On the way" closed > open
1	0	Not possible
1	1	Pin closed

Pin closed=low/low

S1 = Closer & S2 = Closer

S1	S2	See **A**
0	0	Pin closed
0	1	Not possible
1	0	"On the way" closed > open
1	1	Pin open

Pin closed=high/low

S1 = Opener & S2 = Closer

S1	S2	See **A**
1	0	Pin closed
0	0	"On the way" closed > open
1	1	Not possible
0	1	Pin open

6.4 Readiness for operation

- The electrical, hydraulic and mechanical connections are to be connected professionally.
- All relevant parameters have to be pre-configured correctly

The parameter settings and their meaning are in detail described in the operating instructions.

The following prerequisite must be fulfilled:

- A cooling system for the operating unit is to ensure
- Hot runner system must be on processing temperature
- Operating pressure for the operating unit (see separate operating instructions) is to ensure
- The allocation of the hydraulic hose must match the positions ON/OFF of the operating unit

To check the allocation for the nozzles, you may change into MANUAL MODE (details see operating instructions).

The valve pins can only be operated in heated up condition of the hot runner system. Danger of needle breakage!

7 Operation after Switch ON

- The cascade control system VCON and the installed operation software on the touch boot immediately after switch on. The touch is controlled. That identifies that the touch display is intact. Is the display after switch on not light

Reason	**Trouble Shooting**
Power supply missing	▪ Check power supply of cascade control system VCON
Fuse	▪ Check control fuse

8 Replacement of single components

In compliance with the relevant accidental regulations as well as other general approved safety-relevant, occupational-medical norms the user can replace

↗Power output - Change fuses and/or Solid State Relay

In all other, here <u>not</u> explicitly described cases, send the cascade control system VCON in for repair.

The opening of the housing of the cascade control system VCON may be carried out by authorized persons only. Only skilled and on the risks trained persons may use the device. The relevant accidental regulations as well as other general approved safety-relevant, occupational-medical norms have to be obeyed.

Before opening of the device always switch-off the mains switch and unplug the mains plug or make sure that the device is de-energized. Protect against unintentional reclosing.

Single components must be replaced by components of the same type (see type plate). Take care to transfer the same settings.

Tools		
		Screw driver hexagon socket 6

$_1$) Details on connections see ↗Installation.
$_2$) Details on operation of cascade control system VCON see **operating instructions VCON.**

Reference designation (IEC 81346-2)	*Item designation OLD*

Power output - Change fuses and/or Solid State Relay

Please pay attention to ↗Security References!

Switch-off cascade control system VCON.

Open cascade control system VCON.

Remove the 4 screws of the cover.

Remove cover carefully.

Caution! Protective conductor connected to cover.

Replace fuse on module carrier A11

Identify component with reference designation|*item designation* U11|*A11*.

Replace Solid State Relay

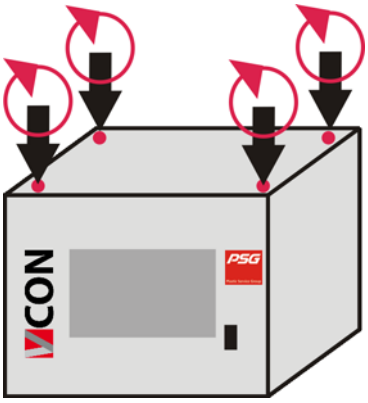
(1) Remove Solid State Relay (Q1...Q4|*V1...V4*) carefully, replace. Continue with (2).

Replace Fuse

(1) Remove Solid State Relay (Q1...Q4|*V1...V4*) carefully. Remove fuse (F1...F4) carefully, replace. Look for right fit. Continue with (2).

(1) Insert Solid State Relay (Q1...Q4|*V1...V4*) again. Look for right fit.

Close cascade control system VCON.



Insert cover again.

Tighten the 4 screws of the cover.

Switch-on cascade control system VCON

9 Appendix

9.1 Consumable and Spare Parts

Order number	**Article description**	**REFD**	***ItDe***	
162 690-01	Fuse 2 A FF (very fast acting)	F1-F4	*F1-F4*	Fuse power output (on rack system)
162 571-01	Solid State Relay 4 A / 24 VDC	Q1-Q4	*V1-V4*	Solid state relay power output (on rack system)
162 651-001	Fuse 6.3 A MT (medium time lag)	F01	*FS*	Control fuse
162 613	Fuse base	F01	*FS*	Control fuse: fuse base
162 614	Cap	F01	*FS*	Control fuse: cap for fuse base

For further information on consumable and spare parts please see the attached documentation, e.g. wiring diagrams, etc.

Reference designation IEC 81346-2 (**REFD**) *Item designation OLD (*ItDe*)*

9.2 Version History

Version	Date	Changes
1.00.01	4/22/2014	In detail, the following amendments/corrections were made: ■ Option pin closed - Sensor definition ■ Item designation transferred into Reference designation IEC 81346-2
1.00.00	9/14/2012	First edition
		PSG Plastic Service GmbH Pirnaer Strasse 12-16 68309 Mannheim Germany Tel. +49 621 7162 0 Fax +49 621 7162 162 www.psg-online.de info@psg-online.de

Technical changes reserved